

Serial No. 10/014,392

In reply to Office action mailed March 15, 2005

Page 2 of 11

Best Available Copy**Amendments to the Claims**

Please amend the claims without prejudice as follows. This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims

1. (Currently Amended) A method of storing data on a storage medium having data storage areas and retrieving the stored data which includes the ability to predict readout errors when the stored data is retrieved, comprising:
 - interleaving the data with a plurality of reference fields to create an interleaved data set, each reference field including a defined data pattern and being placed at a user defined location;
 - storing the interleaved data set within the data storage areas such that the reference fields are at predetermined locations;
 - upon demand, retrieving the interleaved data;
 - analyzing the retrieved interleaved data by testing the retrieved reference field to determine if the retrieved reference field meets a predetermined shape condition and a predetermined amplitude condition; and
 - determining whether readout errors have been encountered based upon the results of the interleaved data analysis.
2. (Original) The method of claim 1 further comprising the production of a reference status byte in response to the analysis step, the reference status byte including an amplitude bit and a shape bit to indicate compliance with the predetermined amplitude condition and the predetermined shape condition, respectively for the analyzed reference field.
3. (Original) The method of claim 1 further comprising the analysis of the reference bytes to perform operating parameter updates for the data storage system.

Serial No. 10/014,392

In reply to Office action mailed March 15, 2005

Page 3 of 11

Best Available Copy

4. (Original) The method of claim 3 wherein the operating parameter updates include adjustments to a readout system in the data storage system so that a read signal offset is optimized.
5. (Original) The method of claim 3 wherein the operating parameter updates include adjustments to a readout system in the data storage system so that a read signal gain is optimized.
6. (Original) The method of claim 3 wherein the operating parameter updates include adjustments to a synchronization system within the data storage system so that optimum phase synchronization can be achieved between a readout signal and a storage media synchronization signal.
7. (Original) The method of claim 5 wherein the read signal gain is optimized by adjusting the readout system to maximize the resolution of the readout window so that the reading of the defined data in the reference field will fill substantially all of the readout window.
8. (Original) The method of claim 4 wherein the read signal offset is optimized by adjusting the readout system to maximize the resolution of the readout window so that the reading of the defined data in the reference field will fill substantially all of the readout window.
9. (Original) The method of claim 2 further comprising predicting the existence in data retrieval errors in the read data on either side of the reference field based upon the reference status byte.
10. (Previously Amended) The method of claim 1 wherein the data is stored on the storage media is analyzed as a virtual matrix to allow for further error correction operations, and wherein the reference fields are arranged as a plurality of columns within the virtual matrix.
11. (Original) The method of claim 10 further comprising the production of a reference status byte in response to the analysis step, the reference status byte including an amplitude bit and a

Serial No. 10/014,392

In reply to Office action mailed March 15, 2005

Page 4 of 11

Best Available Copy

shape bit to indicate compliance with the predetermined amplitude condition and the predetermined shape condition, respectively for the analyzed reference field.

12. (Previously Amended) The method of claim 11 further comprising predicting the existence of data retrieval errors in the read data on either side of the reference field based upon the reference status byte.

13. (Currently Amended) A method of continuously controlling a plurality of operating perimeters and providing error correction capabilities for a data storage system, the method comprising:

storing an interleaved data set which includes a plurality of reference bytes interleaved with information data, each reference byte including a defined data pattern and being placed at a user defined ~~predetermined~~ location within the interleaved data set;

reading the information data and the interleaved reference bytes, and
based upon the defined data pattern of the reference bytes, adjusting operating parameters as necessary and performing error correction analysis.

14. (Previously amended) The method of claim 13 wherein the step of error correction analysis includes analyzing the retrieved reference bytes to determine if the retrieved reference bytes meets a predetermined shape condition and a predetermined amplitude condition; and predicting whether readout errors exist on either side of the reference byte based upon the results of the reference byte analysis.

15. (Previously amended) The method of claim 13 further comprising the production of a reference status byte in response to an analysis of the reference byte, the reference status byte including an amplitude bit and a shape bit to indicate compliance with the predetermined amplitude condition and the predetermined shape condition, respectively.

Serial No. 10/014,392

In reply to Office action mailed March 15, 2005

Page 5 of 11

Best Available Copy

16. (Original) The method of claim 13 further comprising initializing the data storage device by reading an initialization data pattern and adjusting the readout system to maximize the resolution of the readout window so that the reading of the initialization data pattern will fill substantially all of the readout window.
17. (Previously amended) The method of claim 13 wherein the step of adjusting operating parameters involves adjusting a gain window of a readout amplifier so that the readout of the predetermined pattern will fill substantially all of the gain window.
18. (Previously amended) The method of claim 13 wherein the operating parameter is the read signal offset.
19. (Previously amended) The method of claim 13 wherein the operating parameter is the read signal gain.
20. (Previously amended) The method of claim 13 wherein the operating parameter is the phase synchronization of the data storage device read system.
21. (Previously amended) The method of claim 13 wherein the operating parameter is the frequency synchronization of the data storage device read system.
22. (Currently amended) A method of providing optimum read channel operation in a data storage device, the method comprising:
storing data on a storage media which includes periodic reference fields that are interleaved within information data, each reference field including a defined pattern and being located at a user defined location; and
using the periodic reference fields to update a plurality of operating parameters of the read channel and to provide a reference field status byte indicative of possible errors that exist in the data.

Serial No. 10/014,392

In reply to Office action mailed March 15, 2005

Page 6 of 11

Best Available Copy

23. (Original) The method of claim 22 wherein one of the plurality of operating parameter is a read signal gain, wherein the read signal gain is adjusted to an optimum level depending on the results of reading the reference fields.
24. (Original) The method of claim 22 wherein one of the plurality of operating parameter is a read signal offset, wherein the read signal offset is adjusted to an optimum level depending on the results of reading the reference fields.
25. (Original) The method of claim 22 wherein one of the plurality of operating parameter is a read signal phase synchronization, wherein a read clock signal is adjusted to an optimum level depending on the results of reading the reference fields.
26. (Original) The method of claim 22 wherein the reference field status byte is obtained by comparing the amplitude and shape of a readout from the reference field with an expected readout signal, and the reference field status byte is indicative of whether the readout from the reference field matches the expected readout signal.
27. (Original) The method of claim 26 wherein the reference field status byte includes a first bit indicative of whether the amplitude of the readout from the reference field matches the expected readout signal.
28. (Original) The method of claim 27 wherein the reference field status byte includes a second bit indicative of whether the shape of the readout from the reference field matches the expected readout signal.
29. (Original) The method of claim 22 further comprising the performance of an error correction methodology, wherein the reference field status byte is utilized by the error correction methodology to provide efficient error correction.

Serial No. 10/014,392

In reply to Office action mailed March 15, 2005

Page 7 of 11

Best Available Copy

30. (Original) The method of claim 28 wherein the reference field status byte includes further bits indicative of the amplitude of the readout from the reference field.
31. (Original) The method of claim 23 wherein the read signal gain is adjusted to an optimum level which allows for effective signal conditioning.